

THE AUSTRALIAN SESARMINAE (CRUSTACEA: BRACHYURA):  
FIVE SPECIES OF *SESARMA* (*CHIROMANTES*)

B. M. CAMPBELL  
Queensland Museum

ABSTRACT

Three new species of *Sesarma* (*Chiromantes*) and a new subspecies of *S. (C.) semperi* are described, and *S. (C.) livida* is recorded from Australia for the first time. Previous records of *S. (C.) bidens* are presumed to be based on misidentifications.

An original key to the thirteen known Indo-West Pacific species of this subgenus is presented.

Haswell's 1882 catalogue of the Australian Crustacea lists only four species of *Sesarma* (*S. similis* Hess being a synonym of *S. atrorubens* Hess). Since then the recorded total for Australia has risen to only nine species although as far back as 1917 Tesch recorded 93 for the Indo-Pacific region, and this number has now increased to some 115 species. Because much of the Australian coastline exhibits the required ecological conditions for this essentially tropical estuarine genus it seemed that extensive personal collecting was called for, covering as much of the East Australian coast as is readily accessible. Preliminary study suggests that these collections, augmented by material collected independently by Dr. W. Macnae (see Macnae, 1966) will at least double the Australian records. In the present subgenus three of the five species to be described are new, the others have not previously been recorded from Australia. As this subgenus is not well represented in museums within Australia the present work is based almost entirely on the above-mentioned collections. Most specimens have been deposited in the Queensland Museum, and a series of paratypes sent to the Australian Museum, Sydney.

When collecting, considerable attention was paid to habitat data, and an attempt was made to record the penetration of each species up the estuary in terms of salinity. The salinity varies markedly with the state of the tide, and as

the limited time available did not allow more than one reading at most localities, this was recorded as ‰ at an estimated tidal height, and a roughly standardised estimate of salinity at high water was made according to the following table:

State of Tide	Salinity recorded (‰)			
High water . . . .	<5	5-15	15-25	25-35
Half tide . . . .	<2	2-10	10-20	20-35
Low water . . . .	<1	1- 5	5-15	15-35
Estimated high water salinity . . . .	Very low	Low	Moderate	High

This table does not presume to any high degree of accuracy, but is based on a number of readings taken over a range of tidal heights at several localities, mostly on the Burnett River. Although the final estimate can only be approximate it must be more meaningful than a measure of distance from the mouth.

All line drawings were prepared using a camera lucida; those of the male pleopods have been included as much to show the general resemblance between members of this subgenus as to aid in their discrimination. There is an obvious constant facies on which is superimposed variation in such features as orientation of terminal projection, form of extremity of this projection, and relative length and density of bristling (although these latter are subject to intraspecific variation).

Tweedie (1940) commented on the artificiality of the present subgeneric classification of the genus, but while Tesch's (1917) keys remain the basis for students of this genus complete disregard for the subgenera can only make identifications more difficult. Of the four which have been commonly used (*Sesarma* Say, *Holometopus* Milne Edwards, *Parasesarma* de Man, and *Chiromantes* Gistel) the latter does in fact possess the required degree of homogeneity and can be retained on theoretical as well as practical grounds.

#### Subgenus **Chiromantes** Gistel

*Pachysoma* de Haan, 1833, p. 5; 1835, p. 33. (Type species: *Grapsus* (*Pachysoma*) *bidens* de Haan.)

[non] *Pachysoma* Macleay, 1821 (Coleoptera).

*Chiromantes* Gistel, 1848, nom. nov. pro *Pachysoma* de Haan.

*Perisesarma* de Man, 1895, p. 208. (Rathbun's (1918, p. 284) designation of *S. bidens* (de Haan) as type species is inadmissible as that species was not originally included in this subgenus by de Man. *S.* (*Perisesarma*) *dussumieri* Milne Edwards is here designated type species, and *Perisesarma* becomes a junior subjective synonym of *Chiromantes*).

This subgenus is characterised by the presence of at least two transverse pectinate crests on the upper surface of the chela, the associated development of stridulatory tuberculation on the dactyl of the cheliped, and a distinct epibranchial tooth behind the external orbital angle. Thus defined, the subgenus contains the thirteen Indo–West Pacific species which appear in the key below.

Apart from the addition of four new species, the following nomenclatural alterations have become necessary since the publication of Tesch's (1917) revision. *Sesarma siamensis* Rathbun was shown by Tweedie (1936, pp. 66–7) to be a synonym of *S. fasciatum* Lanchester. This species has been excluded from the present subgenus because the pectinate crests on the chela are more nearly longitudinal than transverse, the dactylar ornamentation is spinose, and the epibranchial tooth is never prominent and often absent. *Sesarma bidens indica* de Man, preoccupied by *Sesarma indica* H. Milne Edwards, has become *Sesarma bidens indiarum* Tweedie, 1940. It is here treated as if it had full specific status.

Alcock (1900, p. 415) inadvisedly united *S. dussumieri*, *S. haswelli* de Man, and *S. lividum* A. Milne Edwards with *S. bidens*. This move has been adequately criticised by subsequent workers (see de Man 1895, 1903).

It is extremely difficult to differentiate between some of the members of this subgenus, and much reliance has been placed on the detailed conformation of the tuberculation of the dorsal surface of the dactyl of the cheliped. Tweedie (1954) has shown that this functions as a stridulatory organ, and the pectinate crests on the chela are almost certainly for auditory perception. This whole mechanism must be of prime importance to the crabs as a means of intraspecific recognition, as there are no obvious visual recognition features, and coloration is very variable. If the structural configuration of the tubercles reflects the distinctive sounds which must be produced by them, there is surely some justification for using this exhaustively (but not exclusively) in identification. In practice this is the most convenient, often the only, feature for the construction of a key. It is unfortunate that the tuberculation is not fully developed in females, and the following key can not be relied upon unless males are available.

The key is based on information obtained from original descriptions and figures; from de Man's (1888, pp. 175–80) notes on the types of *S. bidens*, *S. dussumieri*, *S. guttatum* A. Milne Edwards, and *S. lividum*; from Crosnier's (1965) description of and notes on the type of *S. guttatum*; from photographs of the types of *S. guttatum* and *S. lividum* (attempts to locate the type of *S. haswelli*, reported by Kemp (1918, p. 233) to be housed in the Indian Museum, have not been successful); and from examination of specimens of *S. guttatum*, *S. indiarum*, and *S. semperi* Bürger in addition to those described below.

## KEY TO THE INDO-WEST PACIFIC SPECIES OF SESARMA (CHIROMANTES)

(Species in bold face are described in this paper; in the case of other species a reference is given to a recent description.)

1. Distal dactylar tubercle greatly elongate, occupying approximately one-quarter the length of the dactyl.....*S. onychophora* de Man, 1895.  
Indo-Malaysian Archipelago. (See de Man, 1895, p. 214, pl. 31, fig. 39.)  
Distal dactylar tubercle not greatly elongate..... 2
- 2 (1). Dactylar tubercles 7-9 in number, prominent, subcircular, dome-shaped; carapace scattered with small, rounded tufts of hair..... 3  
Dactylar tubercles not prominent, dome-shaped, or if so numbering more than 9..... 4
- 3 (2). Dactylar tubercles 7-8, symmetrical in profile; distal pectinate crest with *c.* 20 teeth.....*S. semperi semperi* Bürger, 1894.  
Philippines, Labuan. (See Bürger 1894, p. 630, pl. 21, fig. 1; de Man, 1903, p. 542; Tweedie, 1950, pp. 342-3, fig. 1e (male pleopod).)  
Dactylar tubercles 8-9, asymmetrical, the proximal slope the longer; distal pectinate crest with *c.* 25 teeth.....  
.....***S. semperi longicristatum* nov.**
- 4 (2). More than 14 distinct dactylar tubercles..... 5  
Dactylar tubercles 14 or less, or if more than 14, the distal ones very low, indistinct, barely discernable..... 7
- 5 (4). Dactylar tubercles 16-19, asymmetrical, the proximal slope the longer, the distal slope nearly vertically deflexed....*S. haswelli* de Man, 1887.  
Tropic central Indo-Pacific. (See de Man, 1888, pp. 175-7.)  
Dactylar tubercles symmetrical or nearly so..... 6
- 6 (5). Dactylar tubercles 19-26, smaller and more closely arranged on the distal third of the dactyl.....*S. eumolpe* de Man, 1895.  
Indo-Malaysian Archipelago. (See de Man, 1895, p. 208, pl. 31, fig. 38.)  
Dactylar tubercles 15-16, spaced further apart distally.....  
.....***S. darwinensis* nov.**
- 7 (4). Breadth of penultimate segment of male abdomen *c.* 1.5 times length  
.....*S. dussumieri* A. Milne Edwards, 1853.  
Tropic central Indo-Pacific. (See de Man, 1888, pp. 177-9, pl. 12, figs. 8-12.)



- Breadth of penultimate segment of male abdomen *c.* twice length. . . . . 8
- 8 (7). Fixed finger short, length of cutting edge *c.* 0·37 times length of propodus; dactylar tubercles forming irregular shapes in dorsal view . . . . . **S. lividum** A. Milne Edwards, 1869.  
Fixed finger longer, length of cutting edge *c.* 0·40 times length of propodus; dactylar tubercles not forming irregular shapes in dorsal view. . . . . 9
- 9 (8). Dactylar tubercles low and indistinct, barely discernable on distal half of dactyl, 14 to 16 in all. . . . . **S. messa** nov.  
All dactylar tubercles distinct. . . . . 10
- 10 (9). Dactylar tubercles each with median raised stripe at right angles to axis of dactyl. . . . . 11  
Dactylar tubercles without median stripe. . . . . 12
- 11 (10). Dactylar tubercles 10–11, large, symmetrical, subcircular, dome-shaped; median stripe smooth; distal pectinate crest with *c.* 15 teeth. . . . . **S. brevicristatum** nov.  
Dactylar tubercles 11–13, those on at least the proximal half oval, the longer axis transverse; medium stripe with grooves (“chiton-like”); distal pectinate crest with *c.* 20 teeth. . . . . *S. guttatum* A. Milne Edwards, 1869.  
East Africa. (See Crosnier, 1965, pp. 68–9, figs. 94, 97, 106.)
- 12 (10). Dactylar tubercles 12–13, oval; male abdomen more than twice as broad as long. . . . . *S. bidens* de Haan, 1835.  
Japan. (See de Haan, 1835, p. 60, pl. 11, fig. 4; pl. 16, fig. 4; Sakai, 1939, p. 688, pl. 79, fig. 1.)  
Dactylar tubercles 11–12, subcircular; male abdomen not more than twice as broad as long. . . . . *S. indiarum* Tweedie, 1940.  
Tropic central Indo-Pacific. (See Tesch, 1917, pp. 134–5; Tweedie, 1950, fig. 1f (male pleopod).)

**Sesarma (Chiromantes) darwinensis** sp. nov.

(Figs. 1A, 2A; pl. 1)

MATERIAL EXAMINED

Holotype: Male (20 mm), Darwin, W. Macnae, Qd Mus. W2442.

Paratype: Male (13 mm), Darwin, W. Macnae (collected with holotype), Qd Mus. W2443.

MATERIAL ILLUSTRATED

Holotype.

## DESCRIPTION

**CARAPACE:** Fronto-orbital width greater than carapace length (*c.* 1.25 times). Lateral margins of carapace only slightly convergent posteriorly, with single epibranchial tooth. Front oblique on either side of broad median emargination, with lateral angles approximately right-angled. Post-frontal lobes distinct, medians only slightly broader than laterals. Carapace hairs arranged sparsely on branchial lines and in sparse, mostly short rows on rest of carapace. Long bristles from median post-frontal lobes meet over frontal furrow. Second branchial line usually arises from first, third variable. Cardiac-intestinal and lateral portions of gastro-cardiac groove deep.

**CHELIPEDS:** Upper surface of chela of male with two transverse pectinate crests, the distal one composed of some 15–20 tall teeth; secondary crest smaller but well developed. Outer surface granulate, with some granules tending to coalesce to form an indistinct median longitudinal ridge. Inner surface with scattered granules, some tending to form a transverse ridge dorsally. Immovable finger somewhat flattened on outer surface, with suggestion of ridge ventrally; length of cutting edge 0.40–0.45 times length of propodus.

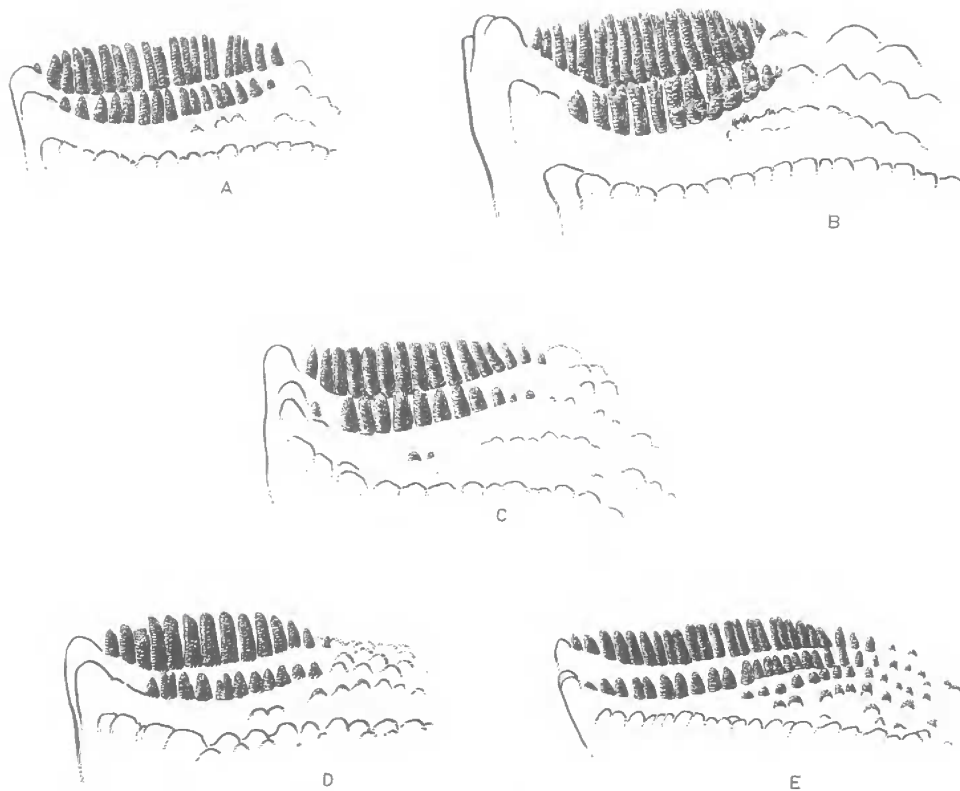


FIG. 1: Postero-dorsal view of pectinate crests on upper surface of chelae of A, *S. (C.) darwinensis*; B, *S. (C.) lividum*; C, *S. (C.) messa*; D, *S. (C.) brevicristatum*; E, *S. (C.) semperi longicristatum*.

Dorsal surface of dactyl with 15–16 distinct symmetrical tubercles with their transverse axes much the longer, and with median striated stripe except the more distal ones, which become progressively more dome-shaped. Proximally there is a row of sharp granules on the inner edge of the dorsal surface of the dactyl.

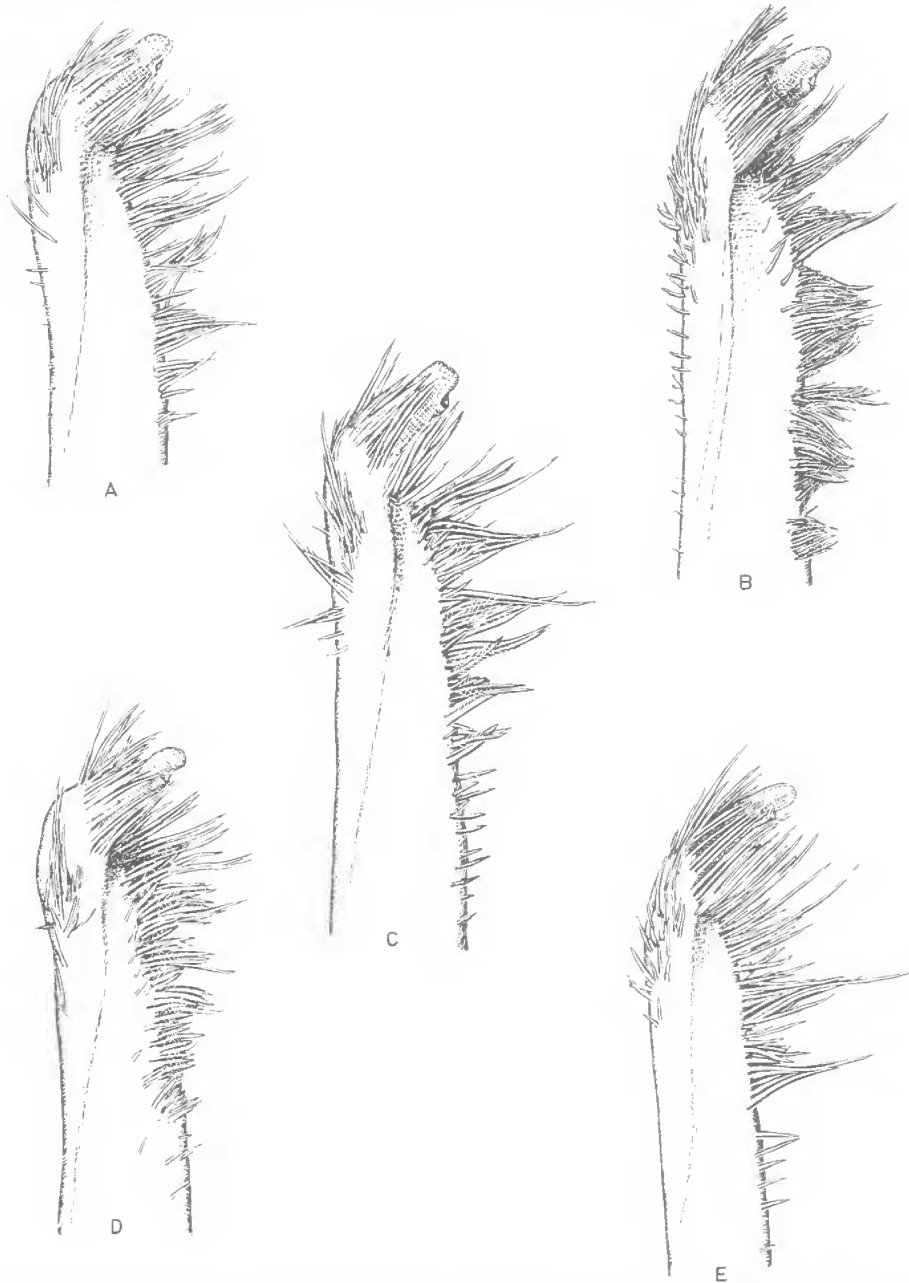


FIG. 2: Right first male pleopods of A, *S. (C.) darwinensis*; B, *S. (C.) lividum*; C, *S. (C.) messa*; D, *S. (C.) brevicristatum*; E, *S. (C.) semperi longicristatum*.

Inner angle of carpus not produced. Dorsal border of merus with small, acute, forwardly directed spine. Ventral border with very prominent, acute, denticulate, subdistal spine.

THIRD AMBULATORY LEG: Twice carapace length. Merus little more than twice as long as broad.

MALE ABDOMEN: Penultimate segment twice as broad as long. Ultimate segment little broader than long.

COLOUR: Alcohol preserved specimens suggest that the original colour was dark mottled carapace, orange chelae, paler legs.

#### HABITAT

Presumably from mangrove mud-flats.

#### COMMENTS

This species differs from de Haan's *S. bidens* in having 15–16 dactylar tubercles (as against 12–13), a broader frontal emargination with less markedly projecting front, and the lateral margins of the carapace more nearly subparallel. (Cf. de Haan, 1835, pl. 16, fig. 4; Sakai, 1939, pl. 79, fig. 1.)

*S. indiarum* Tweedie 1940 differs from the present species in having only 11 subquadrate dactylar tubercles.

*S. haswelli* de Man has 16–19 dactylar tubercles which are markedly asymmetrical.

#### **Sesarma (Chiromantes) lividum** A. Milne Edwards

(Figs. 1B, 2B; pl. 2)

*Sesarma lividum* Milne Edwards, A., 1869, pp. 25–6; 1873, pp. 303–4, pl. 16, figs. 2, 2a. Brocchi, 1875, p. 83.

*Sesarma livida* A. Milne Edwards. de Man, 1887a, p. 659; 1887b, pp. 381–2, pl. 17, fig. 1.

*Sesarma (Perisesarma) livida* A. Milne Edwards. de Man, 1903, p. 539.

*Sesarma (Chiromantes) lividum* A. Milne Edwards. Rathbun, 1910, p. 329.

*Sesarma (Chiromantes) livida* A. Milne Edwards. Tesch, 1917, pp. 169–70; 1918, p. 114.

[non] *Sesarma livida* A. Milne Edwards. de Man, 1888, pp. 179–80 (= *S. onychophora* de Man, 1895).

#### MATERIAL EXAMINED

Seven males (10–26 mm), seven females (15–21 mm), Flying-Fish Pt. road (Innisfail).

## MATERIAL ILLUSTRATED

Male (26 mm), Flying-Fish Pt. road, B.C., 29-10-63, Qd Mus. W2444/1.

## DESCRIPTION

**CARAPACE:** Fronto-orbital width greater than carapace length (c. 1.2–1.25 times). Lateral margins of carapace convergent posteriorly, with single small epibranchial tooth. Front oblique on either side of broad median emargination. Post frontal lobes distinct, medians broader than laterals (c. 1.3 times). Carapace smooth and shining, with hairs along branchial lines and with distinct rows of close-packed hairs on remainder of carapace, particularly anteriorly. Long bristles from median post-frontal lobes meet over the median furrow. Second lateral line arises from, or just short of, first; third variable, usually arises short of carapace margin.

**CHELIPEDS:** Upper surface of chela of male with two transverse pectinate crests, the primary composed of some 15–17 tall teeth; secondary ridge smaller, but still strongly developed. Outer surface granular, sometimes without median longitudinal row. Inner surface with scattered granules. Immobile finger a little flattened on outer surface, with faintly indicated ventral ridge on some specimens; short, length of cutting edge c. 0.36–0.37 times length of propodus. Ventral border of chela not concave at base of fixed finger.

Dorsal surface of dactyl with some 11–13 tubercles of which the proximal 7–8 are distinct, but more distal ones become progressively less developed. The shape of the proximal tubercles appears irregular and is somewhat variable, but usually they are resolvable into pairs. The proximal member of each pair is usually subcircular and longitudinally grooved, the distal member is usually smooth, and roughly crescent or comma shaped, with its proximal border concave. The proximal two-thirds of the inner edge of the dorsal surface bears a row of distinct granules.

In the female the chelae are smaller, relatively more elongate, and the peculiar dactylar tuberculation is less distinctly developed although usually still recognisable.

Inner angles of carpus not produced. Dorsal border of merus with small, acute, forwardly directed spinule, sometimes reduced to a right-angled projection. Ventral border with distinct subdistal spine.

**THIRD AMBULATORY LEG:** Little more than 1.75 times length of carapace. Merus less than twice as long as broad. Length of dactyl c. 0.75 times breadth of merus.

**MALE ABDOMEN:** Penultimate segment twice as broad as long. Second segment not expanded medially.

**COLOUR:** Carapace deep purple with few inconspicuous green spots; legs paler purplish. Cheliped with yellow-orange on inner faces of carpus and merus; chelae yellow-orange on base of inner face, darkening distally, orange-brown on outer face.

## HABITAT

All specimens were collected on the surface of sandy mud by a small stream running through dense mangrove thicket. When disturbed, the crabs took shelter under rocks, tree trunks, or in shallow burrows. Salinity was high (31<sup>0</sup>/<sub>00</sub> at High Water Neap).

## COMMENTS

A comparison of Milne Edwards' (1873) figure of this species with a photograph of his holotype (Paris Museum, male, 26 mm, New Caledonia) reveals many inaccuracies of proportion. To list them here would, in effect, necessitate a repetition of most of the description given above. It is sufficient to say that both the present specimens and the holotype (as far as can be judged from a photograph of the dorsal surface) agree with the above description.

## DISTRIBUTION

From New Caledonia (Milne Edwards, 1869, 1873) to Amboina (de Man, 1903), Java (de Man, 1888), and the Gulf of Thailand (Rathbun, 1910).

Not previously from Australia.

**Sesarma (Chiromantes) messa** sp. nov.

(Figs. 1C, 2C: pl. 3)

*Sesarma bidens*, de Haan? [sic], Miers, 1884, pp. 246-7.

[?] *Sesarma bidens* (de Haan). Grant and McCulloch, 1906, p. 23. Hedley, 1910, p. 343. Stephenson *et al.*, 1931, pp. 42, 61.

[non] *Sesarma bidens* (de Haan), 1835, p. 60.

*S. bidens* is generally regarded as being confined to Japanese waters and is not present in existing collections from Australia. The records listed above are undoubtedly based on misidentifications. Miers (1884) mentions that in his specimens the dactylar tuberculation is much less distinctly marked than in *S. bidens* as figured by de Haan, and it is almost certain that they belong to the present species. Subsequent authors have merely listed the name, and their records are included under this species only because this is the most common and widespread of the *S. bidens*-like species on the Queensland coast.

## MATERIAL EXAMINED

Holotype: Male (23 mm), Townsville, W. Macnae, Feb. 1962, Qd Mus. W2445.

Paratypes: Male (19 mm), two females (17, 20 mm), Townsville, W. Macnae, Feb. 1962 (collected with holotype), Qd Mus. W2446. Male (21 mm), Townsville, W. Macnae, 4-2-62, Qd Mus. W2447. Male (21 mm), female (ovigerous) (20 mm), Townsville, W. Macnae, 8-2-62, Qd Mus. W2448. Female (21 mm), Townsville, W. Macnae, 3-2-62, Qd Mus. W2449. Four males (26, 24, 17, 16 mm), two females



(17, 15 mm), Townsville, W. Macnae, 27-2-62, Qd Mus. W2450. Male (17 mm), Cape Cleveland (Townsville), D. Fielder, 3-9-63, Aust. Mus. P15348. Male (24 mm), Cairns (airport swamp), W. Macnae, Qd Mus. W2451. Male (20 mm), female (22 mm), between Innisfail and Flying-Fish Pt., W. Macnae, 13-3-62, Aust. Mus. P15349. Three males (19, 18, 14 mm), two females (17, 10 mm), one mile towards Innisfail from Flying-Fish Pt., B.C., 29-10-63, Qd Mus. W2452. Two females (24, 20 mm), Pannikin I., Moreton Bay, W. Stephenson, 12-8-58, Qd Mus. W2453. Male (24 mm), Brisbane R. mouth, B.C., Nov. 1964, Qd Mus. W2454. Male (19 mm), Cawarral Ck., Rockhampton, N. Milward, 17-12-65, Qd Mus. W2455.

#### MATERIAL ILLUSTRATED

Holotype.

#### DESCRIPTION

**CARAPACE:** Fronto-orbital width greater than carapace length (c. 1.2 times). Lateral margins of carapace with single epibranchial tooth, slightly concave, subparallel except for projecting external orbital angles and epibranchial teeth. Front with rounded lobes on either side of broad, shallow median emargination. Frontal margin usually distinctly concave laterally, adjacent to blunt lateral angles. Post-frontal lobes distinct, medians broader than laterals (c. 1.3–1.4 times). Carapace smooth and shining, somewhat wrinkled and punctate posteriorly, with hairs along branchial lines and forming distinct rows of close-packed, long hairs on rest of carapace, particularly anteriorly. Long bristles from median post-frontal lobes meet over the median furrow. Second lateral line arises from, or just short of, first; third variable, usually arises short of carapace margin.

**CHELIPED:** Upper surface of chela of male with two transverse pectinate crests, the distal one composed of some 14–19 broad teeth; secondary crest smaller but still well developed. Sometimes a row of horny granules is present proximal to the secondary crest. Outer surface granular, sometimes with a suggestion of a median longitudinal row. Inner surface with scattered granules. Immovable finger a little flattened on outer surface with faintly indicated ventral ridge; length of cutting edge c. 0.40–0.45 times length of propodus. Ventral border of chela concave at base of immovable finger.

Dorsal surface of dactyl with some 14–16 very low, subcircular tubercles of which the proximal 5–8 are distinct, but the more distal ones become progressively almost indiscernable. On the proximal two-thirds of the inner edge of the dorsal surface there is a row of sharp, distinct granules which are often more obvious than the tubercles.

In the female the chelae are smaller, relatively more elongate, but essentially similar in tuberculation to those of the male.

Inner angle of carpus not produced. Dorsal border of merus with small, acute, forwardly directed spinule, sometimes reduced to a right-angled projection. Ventral border with distinct subdistal spine.

THIRD AMBULATORY LEG: Twice carapace length. Merus twice as long as broad, length of dactyl approximately equal to breadth of merus. (In one specimen the dactyl was only 0.75 times the breadth of the merus.)

MALE ABDOMEN: Penultimate segment almost twice as broad as long. Second segment expanded medially so that its median length is approximately twice its lateral length.

COLOUR: Carapace and legs sometimes olive-grey, more usually black to deep violet or reddish-brown, with variable proportion of greenish mottling. Chelae reddish-brown.

#### HABITAT

At approximately H.W.N. in estuaries and sheltered bays in mangrove thicket near water of moderate salinity (minimum 16‰ at half flood tide).

#### COMMENTS

Although recorded localities for specimens on hand range from Moreton Bay north only to Cairns, Macnae (1966, p. 79, as undescribed *Sesarma*) reports that this species is abundant from Thursday I. to Port Curtis.

This species differs from *S. bidens* in having lower, much less distinct dactylar tubercles and more nearly parallel carapace margins. The male abdomen of this species differs from *S. bidens* (see de Haan 1835, pl. 16, fig. 4) and other members of this subgenus here described, in that the second segment is much longer in the mid-line than it is laterally. The specific name was formed from the initial letters of "Medially Expanded Second Segment of Abdomen".

#### ***Sesarma (Chiromantes) brevicristatum* sp. nov.**

(Figs. 1D, 2D; pl. 4)

#### MATERIAL EXAMINED

Holotype: Male (21 mm), Halifax–Lucinda road, W. Macnae, 20-3-62, Qd Mus. W2456.

Paratypes: Female (ovigerous) (17 mm), two indet. (14, 13 mm), Halifax–Lucinda road, W. Macnae, 20-3-62 (collected with holotype), Qd Mus. W2457. Two males (20, 18 mm), Townsville, and Innisfail–Flying-Fish Pt. road, W. Macnae, 13-3-62, Aust. Mus. P15347. Five males (20, 18, 16, 14, 11 mm), female (17 mm), 1 mile towards Innisfail from Flying-Fish Pt., B.C., 29-10-63, Qd Mus. W2459.

#### MATERIAL ILLUSTRATED

Holotype.

## DESCRIPTION

**CARAPACE:** Fronto-orbital width greater than carapace length (c. 1.2 times). Lateral margins of carapace behind the single epibranchial tooth concave, subparallel. Front only slightly sinuous, oblique on either side of broad, shallow median emargination, with lateral angles acute. Median post-frontal lobes distinct, only slightly broader than laterals. Carapace hairs arranged sparsely on branchial lines, and in mostly short rows on anterior half of carapace. Long bristles from the median post-frontal lobes meet over the frontal furrow. Second branchial line arises from first, third arises short of lateral margin.

**CHELIPEDS:** Upper surface of chela of male with two transverse pectinate crests, the primary short, composed of some 15 (13–19) tall teeth, much larger than the secondary crest which may have as few as 6 (to 14) low horny granules. Outer surface granular, with variably indistinct median longitudinal ridge. Inner surface with scattered granules. Immovable finger flattened on outer surface, with slight ridge ventrally; length of cutting edge c. 0.4 times length of propodus.

Dorsal surface of dactyl with 10–11 symmetrical tubercles, the first small, the third the largest, then gradually decreasing in size distally. These tubercles are very prominent, broadly oval or subcircular with a smooth raised stripe at right-angles to the axis of the dactyl. Proximally there is a row of granules on the inner edge of the dorsal surface of the dactyl.

In females and smaller males the proximal pectinate crest may be replaced by a row of granules. the dactylar tubercles are less prominent but still very distinct.

Inner angle of carpus not produced. Dorsal border of merus with small acute forwardly directed spine. Ventral border with very prominent, acute, denticulate subdistal spine.

**THIRD AMBULATORY LEG:** Approximately twice carapace length. Merus little more than twice as long as broad.

**MALE ABDOMEN:** Penultimate segment twice as broad as long, as long as ultimate segment.

**COLOUR:** Dark purplish with pale green mottling, the relative areas of each colour varying from almost entirely purple to almost entirely green. Cheliped with carpus pale yellowish or darker red, chela usually bright orange in large males, sometimes nearly black with variable green mottling.

## HABITAT

In burrows and under logs on sandy mud occasionally on tree trunks to a height of 8 ft, in tall, open mangrove thicket well back from the stream at M.T.L., but covered at H.W.N. Salinity high. Also collected from base of hard, grassed, earth bank on Johnstone R.; salinity low to very low.

## COMMENTS

Recorded localities for specimens on hand range only from Townsville to Innisfail, but Macnae (1966, p. 79, as *Sesarma* cf. *guttata*) reports that this species is common from Thursday I. to Port Curtis.

This species differs from *S. bidens* and from *S. indiarum* in having a less pronouncedly bilobate front and a raised median stripe on each dactylar tubercle. The dactylar tubercles are fewer and more circular than in *S. bidens*, more prominent than in *S. indiarum*. From other species of this subgenus it is readily distinguished by the above key.

The specific name owes its origin to the distal pectinate crest of the chela, which is characteristically rather short and high.

***Sesarma (Chiromantes) semperi longicristatum* ssp. nov.**

(Figs. 1E, 2E; pl. 5)

## MATERIAL EXAMINED

Holotype: Male (20 mm), Rose Bay, Townsville, J. Jackson and B.C., 22-10-63, Qd Mus. W2460.

Paratypes: Two males (14.5, 10 mm), two females (ovigerous) (15, 14 mm), female (12 mm), Thompson's Pt., Rockhampton, B.C., Dec. 1961, Qd Mus. W2461. Five males (19, 15, 13, 13, 13 mm), two females (13, 12.5 mm), Burnett Hds., Bundaberg, B.C., Dec. 1961, Qd Mus. W2462. Male (12 mm), Boyne R., Gladstone, B.C., 12-12-61, Aust. Mus. P15346. Female (ovigerous) (20 mm), Townsville, W. Macnae, 8-2-62, Qd Mus. W2463. Four males (19, 14, 13.5, 12 mm), two females (ovigerous) (19, 14.5 mm), female (15 mm), Port Alma, Rockhampton, B.C., 6-12-61, Qd Mus. W2464. Male (18 mm), Townsville, W. Macnae, 14-2-62, Qd Mus. W2465. Male (17 mm), Sandgate, Brisbane R., Aust. Mus. P7915.

## MATERIAL ILLUSTRATED

Holotype.

## DESCRIPTION

CARAPACE: Fronto-orbital width greater than carapace length (c. 1.25 times). Lateral margins of carapace subparallel, convex behind single very acute epibranchial tooth. Lateral margin of external orbital angle only slightly convex. Front on either side of broad shallow median emargination almost straight, oblique, with lateral angles obtuse or right-angled. Post-frontal lobes not prominent. Median lobes broader than laterals (c. 1.3 times). Carapace with hairs arranged sparsely on branchial lines; remainder of carapace with small tufts of sparse hairs. This tufting is a useful character for the rapid field identification of both sexes. Second and third branchial lines arise short of carapace margin.

**CHELIPEDS:** Upper surface of chela of male with two long, low, transverse pectinate crests, the primary row composed of some 25 teeth, the secondary of some 24. One or two subsidiary rows of horny granules are common proximal to the secondary crest. Outer surface granular, with indistinct median longitudinal ridge. Inner surface with scattered granules. Outer surface of immovable finger flattened, with slight longitudinal ridge ventrally; length of cutting edge *c.* 0.4 times length of propodus.

Dorsal surface of dactyl with 7–9 tubercles, the first the smallest, the third the largest, gradually decreasing in size distally. The tubercles are asymmetrical, the proximal slope the longer. Proximally there is a row of granules on the inner edge of the dorsal surface of the dactyl. In females and smaller males the tubercles are lower, more asymmetrical, the pectinate crests much reduced.

Inner angle of carpus not produced. Dorsal border of merus with small, acute, forwardly directed spine. Ventral border with long, acute, denticulate subdistal spine.

**THIRD AMBULATORY LEG:** A little more than twice carapace length, less than twice fronto-orbital width. Merus *c.* twice as long as broad.

**MALE ABDOMEN:** Penultimate segment twice as broad as long, with sides subparallel proximally, abruptly converging to ultimate segment in distal third. Ultimate segment as long as penultimate, length *c.* 0.8 times breadth.

**COLOUR:** Carapace dark or mottled, chelae pale orange to yellowish.

#### HABITAT

Under stones, among grass, or burrowing in soft mud at H.W.N. in areas of moderate to high salinity.

#### COMMENTS

Although recorded localities for specimens on hand range from Moreton Bay north only to Townsville, Macnae (1966, p. 79, as *Sesarma cf. semperi*) reports that this species is common from Thursday I. to Port Curtis.

*S. semperi* is very close to *S. brevicristatum*, differing from that species most obviously in—

- (1) The tuberculation of the dactyl of the cheliped.
- (2) The length of the pectinate crests on the chela.
- (3) The distinctive patches of disarrayed pubescence on the carapace.
- (4) The arrangement of the branchial lines.
- (5) The much less prominent post-frontal lobes.
- (6) The more obtuse lateral angles of the front.

Specimens of *S. semperi semperi* Bürger obtained from the National Museum of Singapore agreed well with Bürger's (1896) figure (pl. 21, fig. 1a, b, c), but differed in having the margin of the carapace less convergent posteriorly, the penultimate segment of the male abdomen subparallel in the proximal two-thirds rather than converging, and the teeth in the cutting edge of the dactyl more distinct. The presence of the small, distinctive tufts of hair on the carapace of these specimens agreed well with those of the Australian subspecies and were a major factor in deciding that their relationship was subspecific.

*S. semperi longicristatum* differs from typical *S. semperi* in the following particulars:—

- (1) There are 8–9 asymmetrical dactylar tubercles (7–8 symmetrical tubercles in *semperi semperi*).
- (2) The antero-lateral margins of the mesogastric region are less distinct.
- (3) The median post-frontal lobes are lower and less abruptly marked anteriorly than in *S. semperi* s.s.
- (4) The pectinate crests of the chela are longer, some 25 teeth being present in the distal row, and one or two granular, spinous or even pectinate rows are usually present between the proximal crest and the proximal edge of the propodus. In *S. semperi* s.s. there are c. 20 teeth in the distal crest and at the most only a short row of granules proximal to the proximal crest.

The specific name emphasises one of the more easily recognisable distinctions between this and the preceding species.

#### DISCUSSION

The species of this subgenus form a well knit group, their discrimination has always been difficult and their relationships subject to a variety of interpretations (e.g., see Alcock, 1900; de Man, 1895, 1903). The addition of three new species and one subspecies does not simplify the situation and at first glance it would seem that, in the absence of established sympatry, it might be possible to reduce a number of these species to subspecific status. The factors opposing such a step are twofold.

Firstly, it was commonly found that a single mangrove swamp contained populations of *S. lividum*, *S. messa*, *S. brevicristatum* and *S. semperi longicristatum*. The differences between these four are slight, residing principally in the details of configuration of the dactylar tubercles, but these differences are constant and all four indubitably represent distinct species. These four thus provide a rough standard degree of difference between species within the subgenus, and this standard is not overstretched by retaining the existing nominate species as full species.

Secondly, because of the large number of similarities that are shared by all taxa, and the small number of differences, it is difficult to limit any attempt at grouping or to confine any group within the framework of a polytypic species.



Speculation on how such a large group of so closely similar species could have arisen is probably futile without more detailed biogeographic information. Tweedie (1950) has commented on the restricted distribution of this genus as a whole, and it seems possible that limited means of dispersal, the scattering of mangrove swamps suitable for habitation, and the specialised behavioural isolating mechanism which is presumed to be provided by the auditory signalling device of the chelar dactyl could all combine to permit the establishment of genetically discrete populations with such rapidity that there has been no noticeable divergence of other characters.

Within Australia the subgenus appears to have a restricted habitat, being found only on tidal mud flats among mangroves, rarely extending for any distance up estuaries.

#### ACKNOWLEDGEMENTS

I am grateful to Mme. Danièle Guinot of the Muséum National d'Histoire Naturelle, Paris, for sending photographs of several of Milne Edwards' types, to Mr. E. Alfred of the National Museum of Singapore for the loan of specimens of *S. semperi* and of *S. indiarum*, and most especially to Dr. W. Macnae of the University of Witwatersrand for providing so much material personally collected from the Australian coast-line and for sending specimens of *S. guttatum* from South Africa.

Especial thanks are due to Professor W. Stephenson for helpful advice and criticism and to the Photographic Department of the University of Queensland for photographic illustrations.

#### LITERATURE CITED

- ALCOCK, A., 1900. Materials for a carcinological fauna of India. No. 6. The Brachyura Catometopa, or Grapsoidae. *J. Asiat. Soc. Beng.* **69** (2): 279-456.
- BARNARD, K. H., 1950. Descriptive catalogue of South African Decapod Crustacea (crabs and shrimps). *Ann. S. Afr. Mus.* **38**: 1-824.
- BROCCHI, P., 1875. Recherches sur les organes génitaux males des Crustacés Décapodes. *Ann. Sci. nat.* (6) **2** (2): 131 pp., pls. 13-19.
- BÜRGER, O., 1894. Beiträge zur kenntniss der Gattung Sesarma. *Zool. Jb. (Syst.)* **7**: 613-631.
- CROSNIER, A., 1965. Crustacés décapodes Grapsidae et Ocypodidae. *Faune de Madagascar*, 18, pp. 1-143, pls. 1-11.
- GISTEL, J., 1848. "Naturgeschichte des Thierreichs." (Stuttgart).
- GRANT, F. E. and MCCULLOCH, A. R., 1906. On a collection of Crustacea from the Port Curtis district, Queensland. *Proc. Linn. Soc. N.S.W.* **31**: 2-53, pls. 1-4.

- DE HAAN, W., 1833, 1835. Crustacea. In P. F. VON SIEBOLD, "Fauna Japonica." (J. Müller and Sons : Amsterdam).
- HASWELL, W. A., 1882. "Catalogue of the Australian Stalk- and Sessile-eyed Crustacea." (Australian Museum : Sydney).
- HEDLEY, C., 1910. The marine fauna of Queensland. *Rep. Aust. Ass. Advanc. Sci.* **12**: 329-370.
- KEMP, S., 1918. Zoological results of a tour in the Far East. Decapod and Stomatopod Crustacea. *Mem. Asiat. Soc. Beng.* **6**: 217-297.
- MACNAE, W., 1966. Mangroves in eastern and southern Australia. *Aust. J. Bot.* **14**: 67-104.
- MAN, J. G. DE, 1887a. Uebersicht der indo-pacifischen Arten der Gattung *Sesarma* Say nebst einer Kritik der von W. Hess und E. Nauck in den Jahren 1865 und 1880 beschriebenen Decapoden. *Zool. Jb. (Syst.)* **2** (3, 4) : 639-722, pl. 17.
- 1887b. Bericht über die von Herrn Dr. J. Brock im indischen Archipel gesammelten Decapoden und Stomatopoden. *Arch. Naturgesch.* **53** (1) : 215-600, pls. 7-22a.
1888. Report on the podophthalmous Crustacea of the Mergui Archipelago, collected for the trustees of the Indian Museum, Calcutta, by Dr. John Anderson, F.R.S., Superintendent of the Museum. *J. Linn. Soc. Zool.* **22** (138-9) : 129-240, pls. 9-15.
- 1895-1898. Bericht über die von Herrn Schiffs-capitan Storm zu Atjeh, an den westlichen Küsten von Malakka, Borneo und Celebes sowie in der Java-See gesammelten Decapoden und Stomatopoden. Zweiter theil. *Zool. Jb. (Syst.)* **9**: 75-218; **10**: pls. 28-32.
1903. Die von Herrn Professor Kükenthal im Indischen Archipel gesammelten Dekapoden und Stomatopoden. *Abh. senckenb. naturf. Ges.* **25**: 467-929, pls. 19-27.
- MIERS, E. J., 1884. Crustacea. In "Report of the Zoological Collections made in the Indo-Pacific Ocean during the Voyage of H.M.S. *Alert*, 1881-1882." pp. 178-322, pls. 18-24. (London).
- MILNE EDWARDS, A., 1869. Note sur quelques nouvelles espèces du genre *Sesarma* (Say). *Nouv. Arch. Mus. Hist. nat., Paris* **5** (Bulletin) : 25-31.
1873. Recherches sur la faune carcinologique de la Nouvelle-Calédonie. *Nouv. Arch. Mus. Hist. nat., Paris* **9**: 155-332, pls. 4-18.
- RATHBUN, MARY J., 1910. The Danish expedition to Siam 1899-1900. V.Brachyura. (K.) *Danske videnskabernes selskab. Skrifter.* (7) **5** (4): 303-367, 2 pls.
1918. The Grapsoid crabs of America. *Bull. U.S. Nat. Mus.* **97**: 1-461, 161 pls.
- SAKAI, T., 1939. "Studies on the Crabs of Japan. IV. Brachgnatha, Brachyrhyncha." pp. 365-741, pls. 42-111. (Yokendo Ltd.: Tokyo).
- STEPHENSON, T. A.; STEPHENSON, ANNE; TANDY, G.: and SPENDER, M., 1931. The structure and ecology of Low Isles and other reefs. *Sci. Rep. Gr. Barrier Reef Exped.* **3** (2): 17-222.

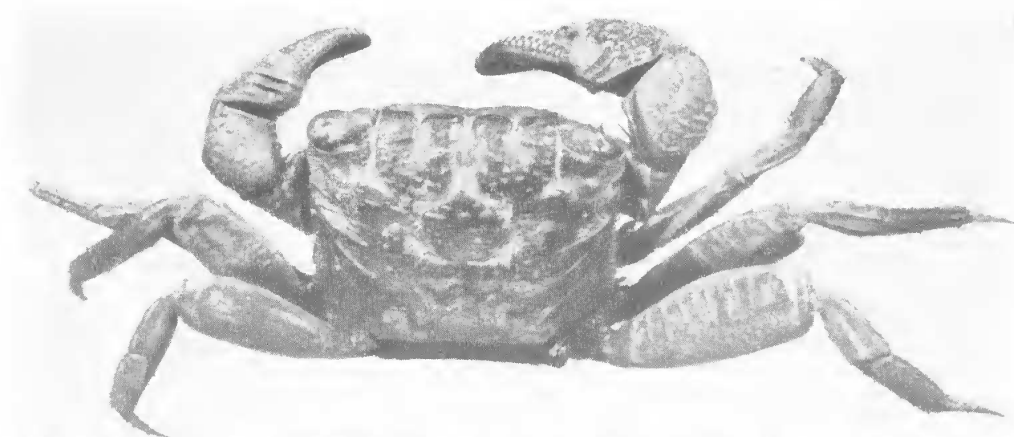
- TESCH, J. J., 1917. Synopsis of the genera *Sesarma*, *Metasesarma*, *Sarmatium* and *Clistocoeloma*, with a key to the determination of the Indo-Pacific species. *Zoöl. Meded.* **3**: 127-260, pls. 15-17.
1918. The Decapoda Brachyura of the *Siboga* Expedition. I. Hymenosomidae, Retroplumidae, Ocypodidae, Grapsidae and Gecarcinidae. *Siboga* Exped., Monogr. 39c. Livre 82, pp. 1-148, pls. 1-6.
- TWEEDIE, M. W. F., 1936. On the crabs of the family Grapsidae in the collection of the Raffles Museum. *Bull. Raffles Mus.* **12**: 44-70, pls. 14, 15.
1940. New and interesting Malaysian species of *Sesarma* and *Utica* (Crustacea, Brachyura). *Bull. Raffles Mus.* **16**: 88-113, pl. 24.
1950. Grapsoid crabs from Labuan and Sarawak. *Sarawak Mus. J.* **5** (2); 338-369.
1954. Notes on Grapsoid crabs from the Raffles Museum, Nos. 3, 4 and 5. *Bull. Raffles Mus.* **25**: 118-128.

MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 1

*Sesarma (Chiromantes) darwinensis.*

Holotype. Scale in mm.



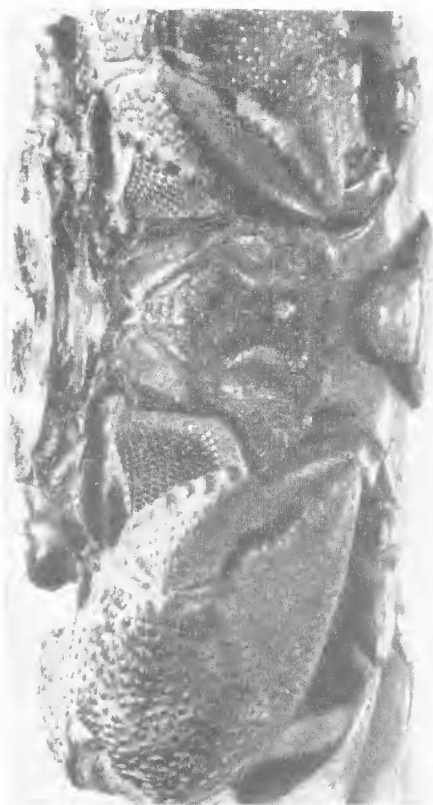
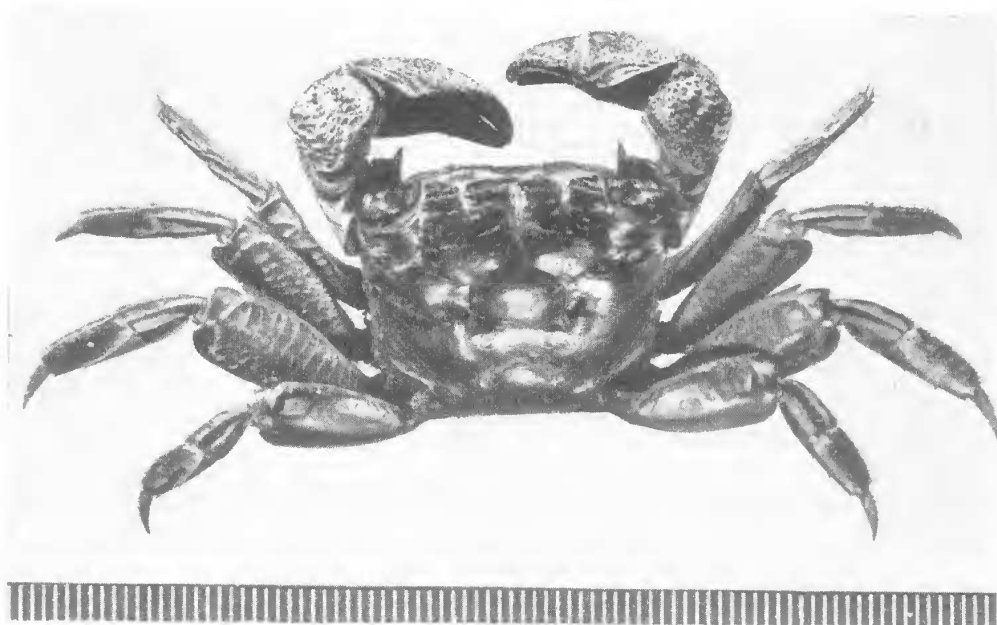
MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 2

*Sesarma (Chiromantes) lividum.*

Scale in mm.



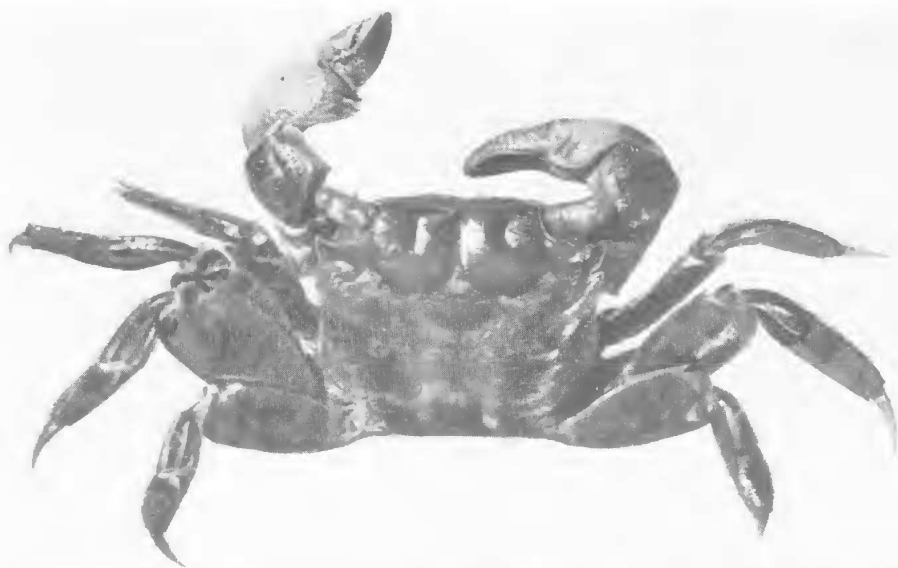


MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 3

*Sesarma (Chiromantes) messa.*

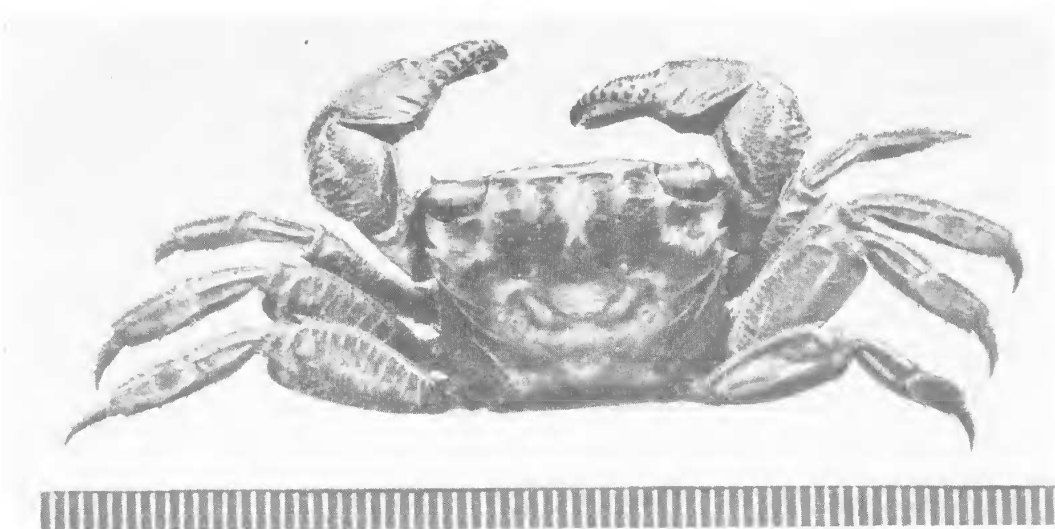
Holotype. Scale in mm.



MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 4

*Sesarma (Chiromantes) brevicristatum.*  
Holotype. Scale in mm.



MEMOIRS OF THE QUEENSLAND MUSEUM

PLATE 5

*Sesarma (Chiromantes) semperi longicristatum.*  
Holotype. Scale in mm.



